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# Nomenclatural Novelties in Chinese *Elymus* (Poaceae, Triticeae)

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**ABSTRACT.** In the treatment of the Triticeae (Poaceae) for the *Flora of China*, *Roegneria* K. Koch is recognized as a synonym of *Elymus* L. This decision led to the following 18 nomenclatural novelties: *E. abolinii* (Drobow) Tzvelev var. *nudiusculus* (L. B. Cai) S. L. Chen & G. Zhu, comb. et stat. nov.; *E. angustispiculatus* S. L. Chen & G. Zhu, nom. nov.; *E. caianus* S. L. Chen & G. Zhu, nom. nov.; *E. cheniae* (L. B. Cai) G. Zhu, comb. nov.; *E. curtiaristatus* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. debilis* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. gmelinii* (Ledebour) Tzvelev var. *macrantherus* (Ohwi) S. L. Chen & G. Zhu, comb. nov.; *E. hongyuanensis* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. kamoji* (Ohwi) S. L. Chen var. *macerrimus* G. Zhu, var. nov.; *E. laxinodis* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. magnipodus* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. serpentinus* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; *E. shouliangiae* (L. B. Cai) G. Zhu, comb. nov.; *E. sinicus* (Keng) S. L. Chen var. *medius* (Keng) S. L. Chen & G. Zhu, comb. nov.; *E. sinoflexuosus* S. L. Chen & G. Zhu, nom. nov.; *E. strictus* (Keng) Á. Löve var. *crassus* (L. B. Cai) S. L. Chen & G. Zhu, comb. et stat. nov.; *E. trichospicula* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.; and *E. yushuensis* (L. B. Cai) S. L. Chen & G. Zhu, comb. nov.

**Key Words:** China, *Elymus*, Poaceae, *Roegneria*, Triticeae.

The grass tribe Triticeae is complex for its taxonomy at the generic level mainly because of the existence of many natural and artificial intergeneric hybrids (Stebbins, 1956; Dewey, 1982; Barkworth & Dewey, 1985; Kellogg, 1989). It has been suggested by different authors that the tribe consists of a single genus or up to 38 genera (Löve, 1984). The generic limits of *Roegneria* K. Koch and *Elymus* L. are among the well-known taxonomic problems in the tribe (Dewey, 1982, 1983, 1984; Löve, 1984; Kellogg, 1989; Zhu et al., 1990; Zhu & Yang,

1990; Baum et al., 1991; Cai, 1997; Yang et al., 2001).

Linnaeus (1753) included five species within *Elymus*, which was lectotypified by Hitchcock (in Hitchcock & Green, 1929) on *E. sibiricus* L. Since 1753, the generic name has been adopted by most authors, but with very different taxonomic concepts. Traditionally, this genus consists of grass species with more than one (often two) spikelets at each node. Based on such a concept, Hitchcock (1935) included *Leymus* Hochstetter and *Psathrostachys* Nevski in his delimitation of *Elymus*. Nevski (1934) placed these traditional *Elymus* species under *Clinelymus* (Grisebach) Nevski, and included some unrelated rhizomatous species under *Elymus*. This treatment was accepted by Keng (1959). In addition to these traditional species, Tzvelev (1976) also included in *Elymus* those self-pollinated species with clustered habit and always one spikelet per node.

The name *Roegneria* K. Koch was published in 1848, based on *R. caucasica* K. Koch, and was mostly ignored for almost a century afterward. Its species, characterized by a single spikelet per node, were mostly treated in *Agropyron* Gaertner sensu lato (Bentham & Hooker, 1880; Hitchcock, 1935; Bor, 1960). When redefining the generic limits within the Triticeae, Nevski (1934) limited the generic concept of *Agropyron* to only the typical wheatgrass species and revived the name *Roegneria*. *Agropyron* sensu stricto has been widely accepted since then. The genus *Roegneria* has been accepted principally by Chinese and Japanese authors (Ohwi, 1941, 1942; Keng, 1959; Keng & Chen, 1963; Yang, 1980, 1987; Zhu et al., 1990; Zhu & Yang, 1990; Zhang et al., 1991; Baum, 1991; Cai, 1997), but has been treated in the synonymy of *Elymus* by others (Melderis, 1980; Dewey, 1982; Löve, 1984; Clayton & Renvoize, 1986; Chen, 1997). In the treatment of the Triticeae for the *Flora Reipublicae Popularis Sinicae*, Yang (1987) included only those species with two spikelets per node under *Elymus* and included all those



with one spikelet per node in *Roegneria*. Yang's concepts are widely accepted in China. The genus *Roegneria* is recognized in all present Chinese local floras, and new species are continually being described under this name (Zhu et al., 1990; Zhu & Yang, 1990; Cai, 1994, 1996a, 1996b, 1997; Cai & Wang, 2001).

The aim of this article is not to justify the inclusion of *Roegneria* within *Elymus*. One may argue both ways due to the taxonomic complexity of the whole tribe. As coauthors of the treatment of tribe Triticeae for the English-language *Flora of China* (Chen & Zhu, in prep.), we have decided to treat *Roegneria* as a synonym of *Elymus*. This requires the following 18 new names or new combinations to be made available for the *Flora*.

1. ***Elymus abolinii*** (Drobow) Tzvelev var. ***nudiusculus*** (L. B. Cai) S. L. Chen & G. Zhu, comb. et stat. nov. Basionym: *Roegneria nudiuscula* L. B. Cai, Acta Phytotax. Sin. 35: 171. 1997. TYPE: China. Xinjiang: Nileke, along bank of stream, alt. 1650 m, 6 July 1976, *Exped. Xinjiang 1746* (holotype, XJBI).

Only two collections are known of this variety. A second specimen cited in the protologue, *N. R. Cui* 82987, was collected from Xiyuan County, Xinjiang, but was not seen by the present authors. This specimen is presumably deposited in Xinjiang Normal University herbarium (XJNU), where the collector was employed. The holotype can be easily identified as *Elymus abolinii* and differs only in having spikelets with 4 or 5 florets each and anthers ca. 5 mm long. *Elymus abolinii* is a variable species. Other characters discussed in the protologue of *Roegneria nudiuscula*, such as spikes relatively short, glumes lanceolate and acute, lemma densely pubescent, and the length of lemma awns, all fall within the range of variation of *E. abolinii*. Therefore, the former taxon can only be accepted at the varietal level under the latter.

The basionym of *Elymus abolinii* is *Agropyron abolinii* Drobow, the epithet of which was spelled “*abolini*” in the protologue (Drobow, 1925). The species was named after the type collector, Robert Ivanovich Abolin, so according to Article 60.11 of the ICBN (Greuter et al., 2000), the epithet was correctly changed to “*abolinii*” when Tzvelev made the new combination under *Elymus*.

2. ***Elymus angustispiculatus*** S. L. Chen & G. Zhu, nom. nov. Replaced synonym: *Roegneria angusta* L. B. Cai, Acta Phytotax. Sin. 34: 332, fig. 3(1–9). 1996, non Trinius ex Ledebour, Fl. Altaic. 1: 119. 1829. TYPE: China. Qinghai: Xunhua, on mountain slope, alt. 2200 m, 8 July 1984, *G. X. Lei* 841810 (holotype, HNWP).

A new name for this species is proposed here because the epithet “*angustus*” is not available for use in the genus *Elymus*. *Elymus angustispiculatus* is compared in its protologue for unknown reasons with *E. barbicallus* (Ohwi) S. L. Chen, which is not closely related. The latter is easily distinguishable by its awnless glumes. *Elymus angustispiculatus* is in fact closest to *E. tibeticus* (Melderis) G. Singh in having spikelets sessile, glumes shortly aristate, lemma with long awns, and palea nearly as long as the lemma. *Elymus angustispiculatus* differs from *E. tibeticus* in having spikes 8–10 cm long (vs. 10–16 cm long) and lemma sparsely pubescent (vs. glabrous) with awns strongly recurved (vs. straight or slightly curved).

3. ***Elymus caianus*** S. L. Chen & G. Zhu, nom. nov. Replaced synonym: *Roegneria gracilis* L. B. Cai, Acta Phytotax. Sin. 34: 328–330, fig. 1(9–15). 1996, non Philippi, Linnaea 33: 301. 1865. TYPE: China. Xizang [Tibet]: Gongbogyamda, along bank of river, alt. 3970 m, 21 Sep. 1988, *J. L. Yang et al.* 880788 (holotype, SAUTI).

A new name for this species is proposed here because the epithet “*gracilis*” is not available for use in the genus *Elymus*. It is named in honor of Lianbing Cai, who first described this species. *Elymus caianus* was compared with *E. puberulus* (Keng) Á. Löve in its protologue. However, little similarity can be found between these two species. *Elymus caianus* is readily distinguishable from the sparsely tufted *E. puberulus* by its single-culmed habit. In addition, *E. caianus* has spikelets purple with 3 or 4 florets each and the lower glume much less than half as long as the lemma, whereas *E. puberulus* has spikelets green with 2 or 3 florets each and the lower glume about half as long as the lemma. *Elymus caianus* is similar to *E. hongyu-anensis* L. B. Cai in the above characters, but differs in having spikes more or less pendulous, palea spiny but glabrous between the keels, and anthers yellow.



4. ***Elymus cheniae*** (L. B. Cai) G. Zhu, comb. nov. Basionym: *Roegneria cheniae* L. B. Cai, Acta Phytotax. 34: 333, fig. 3(10–18). 1996. TYPE: China. Xinjiang: Zhaosu, alt. 2300 m, 3 Aug. 1978, K. Tuo 780875 (holotype, XJBI).

Although without an explicit indication, *Roegneria cheniae* was originally named in honor of Shouliang Chen. *Elymus cheniae* was compared with *E. sylvaticus* (Keng & S. L. Chen) S. L. Chen in the protologue. However, these two species share little similarity except that their glumes are relatively narrow for the genus, and the lower glume is more than half as long as the lemma. These characters are shared by many other species in the genus. *Elymus sylvaticus* is easily distinguished from the former as a much larger plant with shortly awned glumes. *Elymus cheniae* is similar to *E. magnicaespes* (D. F. Cui) L. B. Cai in having spikes narrow, 5–13 cm long, glumes narrow and awnless, and lemma blunt or slightly mucronate at the apex, but differs in having 2–4 florets per spikelet vs. 4–6 in *E. magnicaespes*.

5. ***Elymus curtiaristatus*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria curtiaristata* L. B. Cai, Guihaia 16: 200, fig. 1(10–15). 1996. TYPE: China. Xizang [Tibet]: Changdu, Xishan, alt. 3400 m, 22 Aug. 1973, Exped. Xizang 1988 (holotype, HNWP).

*Elymus curtiaristatus* is compared in its protologue with *E. alashanicus* (Keng) S. L. Chen, as both have lower glumes half as long as the lemma. However, *E. curtiaristatus* is easily distinguishable by the awn of the lemma, whereas *E. alashanicus* has lemmas nearly awnless. *Elymus curtiaristatus* is closer to *E. calcicola* Keng in having spikes erect, glumes submuticate, lower glume half as long as the lemma, lemmas with conspicuous awns, and spikelets nearly sessile. *Elymus curtiaristatus* differs in having lemmas with awns erect and short (5–10 mm long) and culms 3-noded, whereas *E. alashanicus* has lemmas with awns strongly recurved and long (15–28 mm long) and culms often 5-noded.

6. ***Elymus debilis*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria debilis* L. B. Cai, Acta Phytotax. Sin. 34: 327, fig. 1(1–8). 1996. TYPE: China. Gansu: Sunan, in forest, alt. 2350 m, 29 July 1991, T. N. He 2939 (holotype, HNWP).

*Elymus debilis* is only remotely similar to *E. calcicolus* (Keng) Á. Löve, with which it is compared

in the protologue, in the slender appearance of the culms. *Elymus calcicolus* is a much larger plant (ca. 1 m tall), with spikes 12–20 cm long, whereas *E. debilis* is smaller (up to 60 cm tall) with spikes 9–11 cm long. *Elymus debilis* is closest to *E. schrenkianus* (Fischer & C. A. Meyer) Tzvelev in having glumes shortly aristate, less than half as long as the lemma, and lemma awns mostly straight or only slightly curved. *Elymus debilis* differs from *E. schrenkianus* in having culms slender with 5–7 nodes (vs. robust with 1–3 nodes), lemma 7–10 mm long (vs. 15–25 mm long), and palea longer than lemma (vs. as long as lemma).

7. ***Elymus gmelinii*** (Ledebour) Tzvelev var. ***macrantherus*** (Ohwi) S. L. Chen & G. Zhu, comb. nov. Basionym: *Agropyron turczaninovii* Drobow var. *macrantherum* Ohwi, Acta Phytotax. Geobot. 10: 98. 1941. TYPE: China. “Mongolia interior [Nei Mongol] boreali-orientalis (Kochito Orientalis),” I. Hirayoshi 10277 (holotype, KYO).

*Agropyron turczaninovii* is regarded as a synonym of *Elymus gmelinii*. The latter species is characterized by having erect spikes, lemma awns divergent, palea nearly as long as the lemma, and anthers very short. Variety *macrantherus* differs from variety *gmelinii* in having much taller culms (up to 100 cm tall), longer spikes (5–25 cm long), broader glumes, and lemma awns 10–14 mm long.

8. ***Elymus hongyuanensis*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria hongyuanensis* L. B. Cai, Acta Phytotax. Sin. 35: 157, pl. 1, figs. 1–9. 1997. TYPE: China. Sichuan: Hongyuan, in meadow, alt. 3400 m, 23 Sep. 1979, W. Z. Xie 005 (holotype, HNWP).

*Elymus hongyuanensis* is similar to *E. caianus* in having glumes awnless, lower glume less than half as long as the lemma, and lemma awns straight and long, but differs in having spikes arching, palea spiculose between the keels, and anthers black-yellow.

9. ***Elymus kamoji*** (Ohwi) S. L. Chen var. ***macerrimus*** G. Zhu, var. nov. *Roegneria kamoji* Ohwi var. *macerrima* Keng, in Keng & S. L. Chen, J. Nanjing Univ. (Biol.) 3: 17. 1963, nom. inval. (Art. 43.1). *Roegneria kamoji* subsp. *macerrima* (Keng) N. R. Cui, Claves Pl. Xinjiang. 1: 153. 1982, comb. inval. TYPE: China. Guangxi: “Hsing-an [Xing’an], along Li-Kiang [Lijiang],” 15 July 1937, H. Fung 21054 (holotype, N).



*Elymus kamoji* var. *macerrimus* is validated by reference to the diagnosis of *Roegneria kamoji* var. *macerrima*. The latter is an invalid name under Article 43.1 of the ICBN (Greuter et al., 2000) because *R. kamoji* is itself invalid under Article 34.1(c), having been published merely as a synonym in the protologue of *Agropyron kamoji* Ohwi (Ohwi, 1942: 179). Several authors have mistakenly regarded *R. kamoji* as a valid name (Keng, 1959; Cui, 1982; Yang, 1987; Chen et al., 1987). Chen (in Chen et al., 1987) published the new combination *Elymus kamoji*, citing *R. kamoji* as the basionym with a full reference to its author and place of publication. This can be regarded as a bibliographic error of citation for *A. kamoji* under Article 33.4, and it does not invalidate the publication of the new combination.

*Elymus kamoji* is characterized by having lower glumes conspicuously shorter than the lemma, both glumes and lemma with broad, membranous margins, palea keels conspicuously winged, and lemma not ciliate. Variety *macerrimus* differs from variety *kamoji* in having leaf blades often recurved and ca. 2 mm wide (vs. 3–13 mm wide), spikes pale green or grassy yellow (vs. green tinged with purple) and 2–6 cm long (vs. 7–20 cm long), and spikelets with 2–5 (vs. 3–10) florets each.

**10. *Elymus laxinodis*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria laxinodis* L. B. Cai, Guihaia 16: 199, fig. 1(1–9). 1996. TYPE: China. Sichuan: Kangding, on mountain slopes, alt. 3700 m, 18 Sep. 1973, *Exped. Xizang* 2599 (holotype, HNWP).

*Elymus laxinodis* is similar to *E. parviglumis* (Keng) Á. Löve in having awnless glumes conspicuously shorter than the lemma and lemma sparsely hirtellous with awns longer than the lemma body. *Elymus laxinodis* differs from *E. parviglumis* in having spikelets each with 2–5 (vs. 5–9) florets, the palea conspicuously shorter than the lemma (vs. nearly as long as the lemma), and the glumes 2- or 3-veined (vs. 3–5-veined).

**11. *Elymus magnipodus*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria magnipoda* L. B. Cai, Acta Phytotax. Sin. 35: 164, pl. 1, figs. 18–26. 1997. TYPE: China. Qinghai: Golmud, in gravelly places along river banks, alt. 3160 m, 19 June 1963, *Exped. Abandoned Land* 001 (holotype, HNWP).

*Elymus magnipodus* is similar to *E. puberulus* (Keng) Á. Löve, but differs in having scapes slender, spikelets sessile, glumes submuticate, and

lemma aristate, with awns straight or slightly curved. *Elymus magnipodus* differs from *E. puberulus* in having leaf blades recurved (vs. not recurved), spikes erect (vs. nodding or recurved), spikelets each with 6–8 (vs. 2–3) florets, and lemma awns about as long as (vs. twice as long as) lemma body.

**12. *Elymus serpentinus*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria serpentina* L. B. Cai, Acta Phytotax. Sin. 35: 167, pl. 2, figs. 1–9. 1997. TYPE: China. Hebei: Yuxian, along bank of river, alt. 2010 m, 10 July 1957, *Exped. Shanxi* 10147 (holotype, HNWP).

*Elymus serpentinus* is similar to *E. serotinus* (Keng) Á. Löve in having lax, narrow spikes, oblong-lanceolate glumes, the lower glume aristate, and lemma with a strongly recurved awn. However, *E. serpentinus* differs from *E. serotinus* in having leaf blades sparsely pilose on the adaxial surface, glumes dentate on at least one side, the upper glume also aristate, the lemma glabrous on the abaxial surface, with an awn 14–18 mm long, and the palea much shorter than the lemma. *Elymus serpentinus* is also similar to *E. sinoflexuosus* S. L. Chen & G. Zhu in spike appearance and the shapes of the lemma and glumes, but both glumes are aristate in the former species and never dentate in the latter.

**13. *Elymus shouliangiae*** (L. B. Cai) G. Zhu, comb. nov. Basionym: *Roegneria shouliangiae* L. B. Cai, Acta Phytotax. Sin. 35: 161, pl. 1, figs. 10–17. 1997. TYPE: China. Xizang [Tibet]: Gyirong, river banks, alt. 2800 m, 6 July 1975, C. Y. Wu et al. 678 (holotype, PE).

*Roegneria shouliangiae* was named in honor of Chen Shouliang. *Elymus shouliangiae* is similar to *E. brevipes* (Keng) Á. Löve in having spikelets subsessile, loosely arranged on the spike, glumes awnless, lanceolate or oblong-lanceolate, and lemma awns recurved. *Elymus shouliangiae* differs from *E. brevipes* in having much longer spikelets (2.6–3.2 cm long), more florets (8–10) in each spikelet, much longer glumes (7–9 mm long), the upper glume shortly aristate, and anthers brown, 4–5 mm long.

**14. *Elymus sinicus*** (Keng) S. L. Chen var. **medius** (Keng) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria sinica* var. *media* Keng, in Keng & S. L. Chen, J. Nanjing. Univ. (Biol.) 1: 35. 1963. TYPE: China. Shanxi: Mt. Wutai, roadside, alt. 3500–4000 m, 11 July 1929, T. Tang 1045 (holotype, PE).



*Elymus sinicus* is characterized by having culms with 2 or 3 nodes, spikelets each with 4 or 5 florets, the lower glume only slightly shorter than the lemma, and the lemma sparsely pubescent, with the awn much longer than the lemma body. Variety *medius* differs from variety *sinicus* in having leaf blades up to 7 mm wide (vs. 3–4 mm wide) and glumes shortly aristate with awns 1–3 mm long (vs. 1–1.8 cm long).

- 15. *Elymus sinoflexuosus*** S. L. Chen & G. Zhu, nom. nov. Replaced synonym: *Roegneria flexuosa* L. B. Cai, Acta Phytotax. Sin. 34: 330, fig. 2(1–9). 1996, non Tausch, Flora 20: 120. 1837. TYPE: China. Gansu: Zhangye, on mountain slope, alt. 1750 m, 1 Aug. 1957, X. Z. Zhang 203 (holotype, WUK).

A new name for this species is proposed here because the epithet “*flexuosus*” is not available for use in *Elymus*. The species is similar to *E. serotinus* (Keng) Á. Löve in having lax, narrow spikes, oblong-lanceolate glumes, and the lemma with a strongly recurved awn. However, *E. sinoflexuosus* differs from *E. serotinus* in having glabrous leaf sheaths and glumes, glumes with 5–7 veins, the lower glume aristate, and the palea glabrous between the keels.

- 16. *Elymus strictus*** (Keng) Á. Löve var. ***crassus*** (L. B. Cai) S. L. Chen & G. Zhu, comb. et stat. nov. Basionym: *Roegneria crassa* L. B. Cai, Acta Phytotax. Sin. 34: 332, fig. 2(10–16). 1996. TYPE: China. Ningxia: Yanchi, on mountain slope, alt. 1800 m, 21 July 1977, Z. Y. Zhang & H. J. Wang 140 (holotype, WUK).

Variety *strictus* is characterized by having lemmas glabrous in the middle of the abaxial surface, more or less puberulous elsewhere, and paleas puberulous between the upper keels. Variety *crassus* differs from variety *strictus* in having lemmas abaxially glabrous or hirsute along the veins, the callus hirsute, and paleas glabrous between the keels.

- 17. *Elymus trichospicula*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria trichospicula* L. B. Cai, Bull. Bot. Res., Harbin 14: 340, fig. 2. 1994. TYPE: China. Qinghai: Yushu, near forest, alt. 3500 m, 17 Aug. 1981, Z. D. Wei 22414 (holotype, NWBI).

*Elymus trichospicula* is characterized by having glumes awnless with 3 keels, the lower glume about half as long as the lemma, and the lemma densely villous with an awn 6–12 mm long. In the proto-

logue, *E. trichospicula* was compared with *E. sinicus* (Keng) S. L. Chen, but the latter has a much larger lower glume, which is much more than half as long as the lemma and can be easily distinguished. *Elymus trichospicula* is similar to *E. dolichaterum* (Keng) Á. Löve and *E. leiotropis* (Keng) Á. Löve in the above characters, but the latter two species have lemmas with much longer awns (15–40 cm long) and glumes with 3–5 keels.

- 18. *Elymus yushuensis*** (L. B. Cai) S. L. Chen & G. Zhu, comb. nov. Basionym: *Roegneria yushuensis* L. B. Cai, Bull. Bot. Res., Harbin 14: 338, fig. 1. 1994. TYPE: China. Qinghai: Yushu, along roadside, alt. 3750 m, 24 Aug. 1980, Z. D. Wei 22105 (holotype, NWBI).

*Elymus yushuensis* and *E. alashanicus* (Keng) S. L. Chen are similar and distinctive in the genus in having spikes short (5–11 cm long), narrow, and lax, glumes lanceolate or oblong-lanceolate, nearly awnless, and lemmas slightly mucronate. *Elymus yushuensis* differs from *E. alashanicus* in having spikes pendent (vs. erect), purple (vs. pale yellow), and hirsute (vs. glabrous).

**Acknowledgments.** We thank Nick Turland (MO), Gerrit Davidse (MO), Sylvia Phillips (K), Victoria Hollowell (MO), and Roy Gereau (MO) for their comments. Special thanks are due to Xilin Yang from Inner Mongolia Teachers' University for his guidance to the senior author. We thank the curators of the following herbaria for the loans of specimens or other assistance with this study: HNWP, PE, SAUTI (Institute of Wheat Research, Sichuan Agricultural University), and XJBI (Xinjiang Institute of Biology, Pedology and Desert Research, Chinese Academy of Sciences).

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